

NEW YORK, SUNDAY, JANUARY 1, 1922.

AROUND THE WORLD IN A DAY IS DREAM OF AVIATORS

Jules Verne's Wildest Idea Outdone by Plans of French Air Engineers

Remarkable Machines, Both Heavier Than Air and of Dirigible Type, Being Built for Revolutionary Attempts to Cross the Atlantic and Enter New Realms of the Air Higher Than Any Ceiling Yet Attained by Man—Louis Breguet and A. Vaugan Offer the Most Radical Ideas—"Higher, Faster, Safer" Is Motto of Gallic Experts

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New York Herald Bureau, Paris, Dec. 24.

COMPARED with France's aviation ideals, those of England, Germany, Italy—yes, even the United States—seem puerile and futile. Without any idea of imperialistic conquest, save perhaps in the realm of commercialism, France has embarked on a program which bids fair to outstrip all the greater nations. While others have been dreaming of extensive networks of small, speedy machines, France has gone a step farther and is dreaming of giant air expresses, some of them with several aerial coaches, supplied with motors which will make possible a round-the-world trip with a score of passengers just as easy as a Twentieth Century run from New York to Chicago.

Engineers may smile and reply, "But it's only a dream," but it was only a dream which Wright pursued to achievement; it was only a dream of possibilities which inspired Edison to work night and day until he had won his goal.

To-day France's aerial workshops are developing this program of superiority with a zest hitherto unknown to the French people. They mean to show the rest of the world that France, satisfied with her record of having established the standard of world culture in past centuries, now can turn her mind to modern progress with equal success. Thousands and thousands of skilled mechanics, scientists, research workers all are bent toward the same aim, thus expressed by a leading authority:

"France must lead the world in aviation development! While others think in speeds of 250 to 300 miles an hour, France must double this figure; while larger Powers boast of their prospects of making profitable short hauls of merchandise and tourists, France must work toward results which will be infinitely greater and give her a prestige in world affairs which cannot be contested by her more favored allies and former enemies, a prestige which will outweigh all military and political considerations and make up for the losses she has sustained in the past decade."

Higher and Faster the Goal

With an Amazing Program
This is the immediate goal of French aviation—"Higher and Faster"; great heavy machines, capable of soaring to heights of 40,000 and 60,000 feet and traveling at unheard of speeds, even while carrying twenty or thirty passengers or their equivalent in merchandise; airships operated on a lighter-than-air principle, but requiring no gas for inflation.

A correspondent of THE NEW YORK HERALD, who has just completed a tour of the principal French aerial engineering establishments, flying fields and rebuilding plants, is able to assert that the French aerial building force is well on its way to accomplishment of this ambition, for there are actually in construction in French workshops to-day a giant all-metal plane, a leviathan of the aerial ocean, with which it is hoped to make flights with passengers and baggage from Paris to New York and from the French capital to the heart of Latin-American republics; a dirigible which depends solely upon rarefied air to provide its lifting power; deadly aerial torpedoes, which can be directed by an unseen hand, by means of wireless, any distance, and dropped over the heads of an advancing army or over the capital of an invading Power, and, finally, airplane trailers, by which it is hoped the train of the air will become an actuality—a powerful "locomotive" plane to which can be "hitched" a half dozen motorless planes, which can be cut off at will, so as to glide to the ground.

One of the most enthusiastic leaders in the rapid development of French aerial construction supremacy, M. Louis Breguet, is even so optimistic as to predict for a not too distant future a plane which within a single day will circumnavigate the globe at the parallel of Paris. Coming from a lesser personage, such a prediction could be classed as an idle boast, but M. Breguet is a pioneer in the science of aerial locomotion, who was putting the finishing touches to a helicopter which eventually flew the very day that Wilbur Wright landed in France, in 1906.

When the war put French aerial designers to the supreme test M. Breguet built in his own plant over 8,000 airplanes for the French and allied forces, a thousand of which were set apart for the use of the American Army. His designs are specifications, lent to other manufacturers, permitted the rapid construction of 10,000 more at a time when the safety of the

allied cause depended upon their procuring and maintaining the supremacy of the air.

To-day M. Breguet is devoted to the work of peace, his energies being directed toward the development of the science to which he has devoted his life. Throughout the twenty years that he has given to research work and actual construction, M. Breguet has been a partisan of the metal construction of all heavier-than-air machines. His first venture was with a helicopter, constructed entirely of duralumin.

The leviathan, which is nearing completion and will be given its tests late this month, is M. Breguet's latest work in construction. Built entirely of metal, there is not a single piece of wood or cloth to be found except for the propeller. It will weigh 13 tons, its wing surface totaling 250 square meters.

The power plant of this plane consists of four motors, synchronized and at the same time acting independently, so that if one motor breaks down the other three will continue to function uninterruptedly and without causing the plane to tilt. They will generate a total of 1,250 horse-power and will move the plane at a speed of from 250 to 300 kilometers an hour. The plane will carry a crew of seven men, twenty passengers, a ton of baggage and four tons of fuel and oil.

Wide Cruising Radio

And Carrying Capacity

It will have a cruising power in the proportion of 2,500 kilos of merchandise or passengers to 600 miles; 4,000 pounds to 1,100 miles or 2,000 pounds to 3,500 miles—the distance across the ocean from France to the United States.

Preliminary tests of the motor have been made and the 1,250 horse-power power plant is running with the precision of a watch. Each part, before it is added to the body of the plane, is given thorough tests, which, while not harming it, provide conclusive proof that it can stand its share of the strain imposed by flight duration.

Beside the new plane in the workshop stands the skeleton of one started by M. Breguet shortly before the armistice, which was intended to make nightly raids over Berlin, carrying two and a half tons of bombs. Work on this has been discontinued, however, for continued study showed that a machine with power plants located in separate cabins on either side of the main cabin would provide greater security and stability than if the two or four group motors were placed in the main fuselage with only one propeller.

Capitaine Vuillemin, a French "ace," who gained fame by being the first man to fly from the heart of France into the heart of Africa, and afterward crossed the Sahara by air, has been selected to pilot the leviathan in all its tests and later in its attempt to cross the Atlantic. Security is one of the keynotes sounded by M. Breguet in his preparations for the construction of the new series of palatial air liners with which he hopes to conquer for France the aerial passenger traffic of the world.

"There is no doubt that aerial locomotion will become the least dangerous among the most rapid forms of travel," said M. Breguet. "All of the unsafe features of the present construction can be abolished. The metal construction immediately eliminates two of the greatest dangers, fire and tearing of the cloth covered fuselage. Mechanical solidity can be obtained by a good construction. The increase in the number of motors and their location in cabins, where they can be easily reached during flight, should make impossible falls due to a breakdown of one motor."

"Security depends also to a great extent upon the landing fields. Aerial ports, level and free of obstacles, are increasing in number, and it is noticeable that accidents due to faulty landing are becoming more and more rare. The danger of fire

Louis Breguet, noted French aeronautical engineer, whose plans for transatlantic planes will be tried in actual flight shortly.



is entirely removed by the use of metal in construction, while the use of heavy oils for fuel will obviate all causes of explosions.

"The strengthening of motors and the increase of speed will permit the plane to fight any storm. Problems of navigation can be solved by the use of wireless equipment and by the location of aerial light-houses along trade routes. The existence of fogs and rains, snow, heavy wind and tempests can interfere to a great extent with land or sea locomotion, but an airplane bearing a powerful motor, fitted with wireless and guided from established posts on the ground, need not fear the elements."

"What is the ideal plane for future use over trade routes?" was asked of the engineer.

"Such a machine must have a strength of at least 2,000 horse-power, weigh from 14 to 16 tons, have a surface of from 200 to 250 square meters, be capable of a speed of 300 kilometers an hour and must be able to mount to heights of 14,000 meters (45,000 feet)," he replied. "I might add that motor plants with a strength of 4,000 and even of 6,000 horse-power are actually under construction. By flying to a height of 14,000 meters the pilot will encounter a ceiling where the density of the air is five times less than at the level of the earth. There is no reason why at such a level a motor should not be capable of a speed of 250 meters a second, or 900 kilometers an hour."

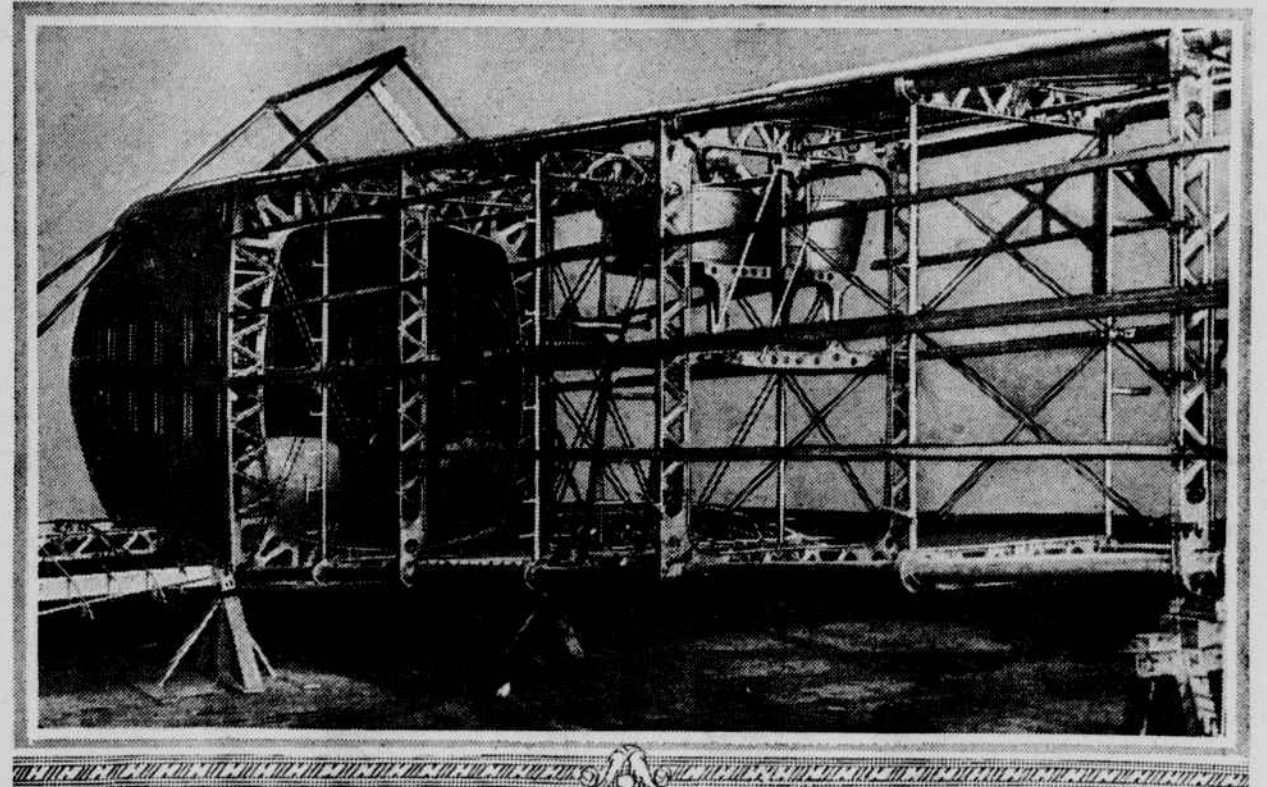
"It is with just such a plane that I hope to see trade lines established between Paris and New York, Paris and Buenos Aires, via Dakar and Rio de Janeiro, and Paris and Tokyo, with stops at Prague, Constantinople, Bagdad, Bombay, Calcutta, Hanol, Shanghai and Yokohama."

What High Flying Means

In Saving of Time

"The distance from Paris to New York, 3,500 miles, should be covered by a plane of such proportions and power in seven hours; the flight to Buenos Aires, a distance of about 7,750 miles, could be made in thirteen hours actual flying time, or at most a day and a half, with stops at Dakar and Rio de

Part of the all metal airplane leviathan being built by Breguet to cross the Atlantic as a regular thing. The power plant develops 1,200 horse-power from three motors. Test flights will be held this month.



Janeiro. The extreme Orient should be reached within four days.

"The fastest travel to-day does not permit a voyage between Paris and New York in less than six days; twelve days are occupied by the newest liners in reaching the South American capitals from Bordeaux, while forty-three days is an average required for the voyage to Japan."

"I figure that, until we have learned to use motors of the Diesel type which will consume heavy oil for fuel, the ton-kilometre will return at about 7½ francs (\$1.50 normal change), while a voyager who, with his baggage does not weigh more than 200 pounds will pay for travel at the rate of 75 centimes (15 cents, normal) a kilometre."

"The cost of travel by air will be greatly lessened the day we can substitute heavy oil for gasoline as fuel, but even now air travel is cheaper than by first-class passage in a good steamship. For instance, a flight to Buenos Aires could be made for 9,000 francs, while the cost of a first-class ticket on the Massilia to-day is 12,000 francs. The cost of a flight to Japan would return at 11,000 francs, against 12,000 francs by boat."

"The time saved by air over water travel can be estimated in the proportion of 1 to 8."

The attention of French engineers is directed at this moment to the perfection of a motor of the Diesel type burning crude oil. The application of the principles of M. Rateau permits a motor to retain its strength even at heights where the air is eight times less dense than at the level of the earth. Once the turbo-compressor, upon which M. Rateau is working, is an accomplished fact, planes will be able to rise thousands of meters above the ceiling already reached. This compressor will nourish the motors with a mixture of air in the same proportion as at the earth's level, so that as far as the power plant is concerned the plane can fly with the same ease at heights of ten or twelve miles as at a few hundred feet.

Fantastic Speed Prediction

Made by M. Breguet

Once the aerial engineers have developed a plane with the greatest ratio of surface, in proportion to its weight, fitted with a heavy oil burning power plant in a series of four or eight separate motors, equipped with a turbo-compressor, permitting flying at heights now undreamed of and capable of a speed of 1,200 kilometers an hour, instead of the 300 kilometers now attained, M. Breguet contends that man will be able to fly around the earth at the parallel of Paris within a day.

"Owing to the reduced density of the air

at a height of 12 or 15 kilometers, it would be possible for an airplane to circumnavigate the globe in twenty-four hours," M. Breguet predicted.

"To do this a plane must carry fuel to the proportion of 65 per cent. of its total weight. The motor of that period will weigh only three kilograms per horse-power and consume 200 grams per horse-power hour. They will be able to maintain a speed of 333 meters a second, that is to say, 1,200 kilometers (750 miles) an hour."

"At the parallel of Paris the earth is 26,000 kilometers in circumference, so that it is mechanically possible to circle the globe in twenty-two hours. Consider the possibilities of such a powerful machine!"

"An aviator, rising above Paris and flying due east—the direction of the earth's movement—at a little less than the maximum speed of his engine would never lose sight of Paris, although continuing to fly for twenty-four hours. In equalling the speed of the earth's rotation his machine would appear motionless above the city, although flying at a speed four times faster than any man has ever flown."

"However, let him rise and then head in a westerly direction. What would happen? In six hours he would pass over the Pacific Ocean and in twelve hours would again be over Paris. He would be traveling toward Paris in a westerly direction at the same speed that the earth in its eastward rotation would be bringing Paris around to him."

Plans a Transatlantic Torpedo

Directed by Wireless Wave

"If we could ever succeed in reducing the weight of the motor to one or one and a half kilograms per horse-power we could arrive at a speed of 800 meters a second, or 2,880 kilometers an hour, the speed with which projectiles leave a long range cannon. This was the velocity with which the heavy shells left the Big Bertha, which shelled Paris during the late days of the war from a distance of 120 kilometers. Such a long range run will be useless in any future war, if such wars are to occur again."

"Without seeking to quarrel with our good friends in America, one can conceive of an aerial torpedo which, launched from the center of France, could cross the ocean and fall with approximate accuracy on any of the large cities in the United States. The distance between Paris and New York or between Paris and Washington is not much over 3,500 miles, and such an airplane torpedo could cover that distance in several hours."

"With the perfection of full wireless control of the airplane these aerial torpedoes could be guided by an unseen hand from any place in France. They could be used in shorter distances with even more accurate and deadly results, and once we have such a fleet of aerial protectors our boundaries and coast lines will be kept free of invaders."

The idea of motorless gliders is not original, although German inventors are claiming to have perfected this form of aerial flight. It will be recalled that Wilbur and Orville Wright, in their earliest tests at Kitty Hawk, jumped from sand dunes and glided to a safe landing on the beach. Ever since that day French engineers have been at work on the idea, and at the recent annual Air Salon, held in the Grand Palais in Paris, were shown the first of these motorless planes intended for commercial purposes.

Within a few months tests will be made at Le Bourget, the Paris air port, with these trailers. They will be hooked behind a plane of the strength of those making daily flights to London, Brussels, Warsaw

and Prague. From a height of 1,000 meters or so they will be "cut off" and brought to earth by volplane methods. Later strings of two and three will be taken up and "cut off" in succession. Each of these trailers is designed to accommodate a pilot and a ton of merchandise.

More than one engineer has become interested in flight by human mechanical means since Gabriel Poulain "flew" a distance of 14 yards in the Bois de Boulogne last summer. His machine consisted of an ordinary bicycle, to which was attached a pair of planes. After cycling along for less than 100 yards, Poulain was able to raise the planes. The machine took off gracefully from the ground and "flew" along at a height of several feet. His next step will be to attach a propeller, which will be operated by the rider's foot pedals. A prize of 40,000 francs had been set up for the first flight by such a propelled machine, over a distance greater than 25 meters.

Marked Departures Made

In Lighter Than Air Craft

The whole of the engineers' attention, however, is not limited to heavier than air machines. The keel has long since been laid for a veritable ship of the air, a dirigible which will operate without an inflation gas and whose range is consequently limited only by the amount of fuel it can carry. Such an airship is the invention of A. Vaugan, a French engineer. The ship is on the ways in a Milan factory and will be ready for its tests early next summer. These tests will be witnessed by representatives of the United States Army and Navy, those departments having already requested much information concerning the ship from its inventor.

The ship under construction will have a length of 375 feet and a height of 100 feet and will be operated by a crew of seven men, and will be capable of carrying 100 passengers or the equivalent of weight in merchandise at a speed of 350 kilometers an hour at a height of 6,000 or 7,000 meters.

This machine is capable of taking the air immediately, without the preparation of filling a gas bag with hydrogen or other gas. Its body consists of three separate air chambers, the frames of which are constructed of aluminum. One frame incloses another, each frame being complete in itself and covered with an impregnable cloth surface. Instead of being built along the lines of the ill-fated ZR-2 and others of the recently built large dirigibles—a series of steel rings as ribs, attached to an upper and lower keel—it consists of a frame of about 300 longitudinal beams, to which are attached about three times that many lateral braces. In this manner the constructors hope to eliminate any danger of a collapse of the frame.

By making the three air chambers separate the safety of the ship is assured, even though one or two of the outer coverings are torn off by the elements, or, in case of war, by enemy fire. The motor plant, consisting of four or six motors, with four or six propellers, is located in a five story cabin at the bows of the big ship. A five decked cabin at the stern is expected to provide accommodations for 100 passengers or 150 tons of merchandise.

Will Rise by Vacuum

Created in Envelopes

One of these decks will be arranged with berths, as is a sleeping car, another as a dining room and the remainder with chairs and tables, so that the voyagers will have the same high class accommodation as on

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Working model of Vaugan's rarefied air dirigible. The airship is designed for Paris-New York flights in 18 hours, with one hundred passengers. No gas is used.

